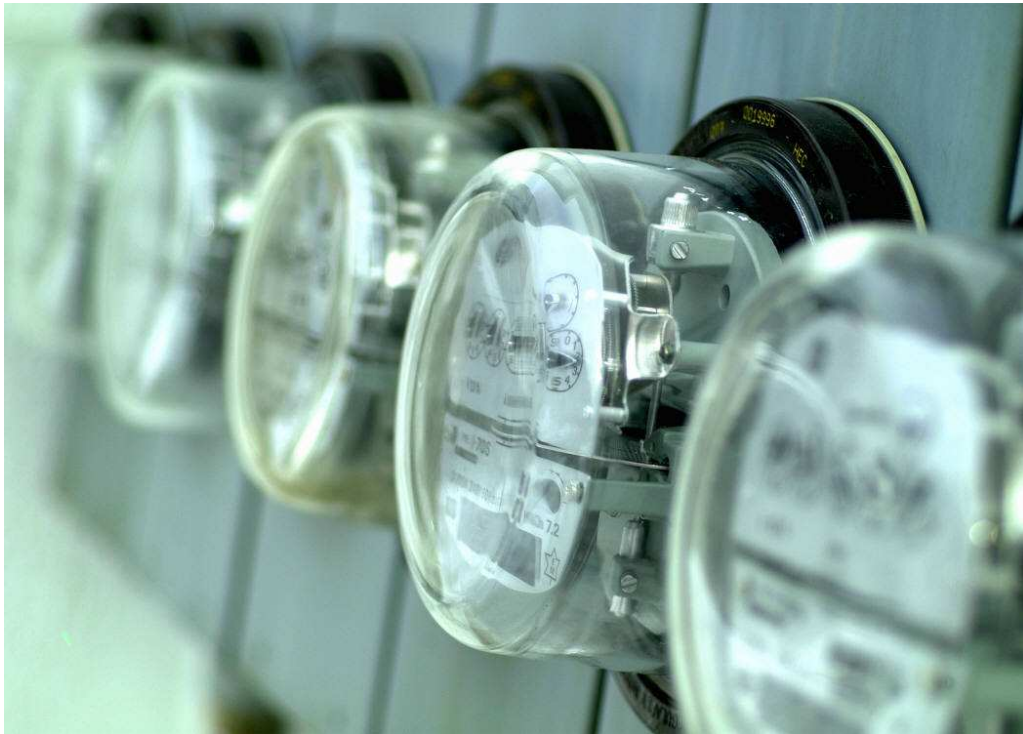


California Energy Commission's  
New Solar Homes Partnership  
Affordable Housing Subcommittee on Metering

## **Recommendations on Metering Issues<sup>1</sup>**



**September 2007**

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<sup>1</sup> Presented to the California Energy Commission's Affordable Housing Advisory Committee for the New Solar Homes Partnership by Resource Solutions Group, on behalf of the Subcommittee on Metering.

# Table of Contents

Table of Contents .....	2
Executive Summary .....	3
Overall Goals .....	6
Definition of Metering Terms .....	6
Table 1. ....	7
Existing Metering Options for PV Installations in Multifamily Affordable Housing .....	8
Table 2. ....	8
Potential Metering Options for PV Installations in Multifamily Affordable Housing .....	8
Option 1 – Individual Tenant Systems.....	8
Option 2 – Master Metering.....	10
Option 3 – The SMUD Model .....	11
Option 4 – Pro-rating of Master Meter Energy Use .....	11
Option 5 – Power Purchase Agreement with Market Reference Price .....	14
Option 6 – The Third Party Ownership Model .....	14
Conclusion .....	15

## *Executive Summary*

In January 2007, several members of the New Solar Homes Partnership (NSHP) Affordable Housing Advisory Committee (AHAC) formed the Subcommittee on Metering. The Subcommittee discussed various issues and challenges to incorporating PV beyond common areas in affordable housing, in an attempt to fulfill its mandate to provide the AHAC with recommendations of ideal scenarios, as well as a summary of outstanding issues.

Per its mandate, the Subcommittee developed an original detailed spreadsheet to explain different metering scenarios, and identify the scenarios which the Subcommittee recommended as the most ideal. This information was presented to the AHAC at its March 23, 2007 meeting. At that time, members of the AHAC requested that the Subcommittee conduct additional research and analysis to consider and address any outstanding metering scenarios.

As a result, the Subcommittee convened two additional times to brainstorm and discuss ideas. The Subcommittee was joined by Mike Keese (SMUD) and Werner Blumer (CPUC) on its May 3, 2007 conference call – which resulted in valuable feedback on both additional models and regulatory issues.

The information contained in this recommendation summary provides the context and framework for the existing barriers with installing PV in a multifamily affordable housing property, as well as recommendations for overcoming the barriers. It is the Subcommittee's intent that the AHAC review the recommendations and consider submitting them formally to the CEC.

The Subcommittee's overall objective was to recommend ideal metering scenario(s) that incorporated the following goals:

- Leverage public investment.
- Create economies of scale.
- Create direct benefits for owner.
- Create direct benefits for tenants.
- Increase tenant awareness.
- Create variety.

The Subcommittee considered various options, the aggregate effect of which reflect the potential opportunity of participation by the entire universe of the affordable housing and low-income housing development community in the California Energy Commission's New Solar Home Partnership Program. Through these options, the Subcommittee recognizes that not all developers possess the financial resources to afford owning and maintaining roof top solar systems. Therefore, to maximize the participation of as many developers as possible, the Subcommittee reviewed six options that range from property ownership to third party ownership scenarios in new multifamily, affordable housing. Those scenarios include:

- Option 1: Individual Tenant Systems – installation of individual solar systems for each dwelling; separate meters; property owner receives and pays all bills; requires zero changes to existing legal and regulatory policies;
- Option 2: Master Metering – one PV system run through one large meter; property owner allocates energy bills based on sub-meter data; requires petitioning of the CPUC to re-instate master- and sub-metering;
- Option 3: The SMUD Model – one system (does not serve tenant spaces) with a power purchase agreement for energy in excess of what the common area uses; property owner uses purchase agreement money to defray cost of installing system and providing additional services; may require changes in rebate law to allow rebates to be given to a system that produces in excess of demand, if as SMUD does, the power is purchased at retail rates<sup>2</sup>;
- Option 4: Pro-rating of Master Meter Energy Use – one PV system with a master net meter that records how much energy is purchased from the IOU, and individual IOU meters that record what each tenant uses; ratio of purchased energy to total of all individual meters is used to pro-rate (net) energy usage for individual tenants before applying the appropriate tariffs; outstanding issues include: true up issues, utility billing software issues, tenant rate issues, and transformer capacity issues;
- Option 5: Power Purchase Agreement with Market Reference Price – similar to Option 3 except that power purchase agreement would be based on market reference price and property owner would need to petition CEC and CPUC supplemental fund for any additional funding;
- Option 6: The Third Party Ownership Model<sup>3</sup> – property owner provides rooftop and allows independent entity to install, maintain, and coordinate production payment with the utility via a lease or some other formal agreement/contract; drawbacks include: administrative challenges, relinquishment of ownership, and risk of shifting contract terms.

After much analysis, the Subcommittee concludes that because of the diverse conditions and resources that multifamily affordable housing developers utilize to complete projects,

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<sup>2</sup> With a Power Purchase Agreement, this arrangement is already acceptable, but only at the CPUC-set price; currently \$0.085/kWh.

<sup>3</sup> There was some dissension amongst Subcommittee members as to whether or not the Third Party Ownership Model should be included as a separate option, since third party ownership could apply to any of the options as long as there was some way to justify the cost. However, in the end, the majority of members agreed that the model should be called out separately, as it best met the sixth goal (variety) and could be the best option for some multifamily projects.

a variety of options needs to be available to successfully implement PV on areas beyond common spaces. However, the Subcommittee opted to limit its recommendations to three options – those which were found to best encompass the aforementioned goals and were thought to be the most viable options. The Subcommittee therefore concludes that the three most viable options are: The SMUD Model (Option 3), the Pro-rating of Mastered Meter Energy Use (Option 4), and the Third Party Ownership Model (Option 6).

## ***Overall Goals***

The Subcommittee's overall objective was to recommend ideal metering scenario(s) that incorporated the following goals:

- ❖ Leverage Public Investment: Since affordable housing is already publicly-supported, utilizing NSHP funds enhances the public's investment by ensuring that the housing stock is sustainable – both environmentally (beyond PV just for the common areas) and in terms of affordability.
- ❖ Create Economies of Scale: Utilizing NSHP incentives in affordable housing diversifies the building stock employing PV and also creates economies of scale, which ultimately reduces the overall cost of PV.
- ❖ Create Direct Benefits for Owner: Since the language of the California Solar Initiative did not specify guidance on where the benefits of excess PV production should go, the Subcommittee assumes the issue is open for the affordable housing community to define. After much consideration, the Subcommittee recommends that the bulk of the direct benefits flow to the owner, in order to recover the cost of the PV system.
- ❖ Create Benefits for Tenants: Depending on the allocation model, a PV system could have either a direct or indirect benefit for tenants. At the very least, the Subcommittee envisions an indirect benefit flowing to tenants, in that the excess production of the PV system would cap their utility expenses and help create consistent living expenses – which ultimately stabilizes tenants in housing.
- ❖ Increase Tenant Awareness: There is value in educating tenants about their energy use and the benefits of PV and conservation. The Subcommittee recommends metering scenarios which allow direct feedback of energy consumption via tenant utility bills (no averaging of bills), as well as feedback of the PV system's production. This serves to build awareness of tenants' habits, conservation efforts, and carbon dioxide footprints.
- ❖ Create Variety: As PV technology progresses and new markets are created, the Subcommittee recommends keeping the metering models open to variety, allowing for different spectrums to be developed – including third-party ownership.

## ***Definition of Metering Terms***

The regulatory and technological details of electric metering in the State of California are complex. Therefore, the Subcommittee developed the following glossary (Table 1) of metering terms to be used to frame the discussions. These definitions were reviewed by the three utilities represented on the committee.

**Table 1.**

<b>Meter Type</b>	<b>As Used in the AHAC M&amp;B Context</b>	<b>Notes</b>	<b>Examples</b>
Utility Meter	Electric meter used by the utility to determine amount of power supplied, for purposes of billing the customer. Includes master meters, individual meters and net meters.		Individual Meters, Master Meters, and Net Meters.
Net Meter	Electric meter that determines the <b>net</b> of power supplied by the utility to the property and power supplied by the property to the utility.	Specific regulations about how they are used need to be considered. Needed for PV systems sized such that the electricity production will at times exceed the property requirements - feeding electricity into the grid.	
Master Meter (Configuration One)	Type of utility meter which is used to measure all electricity to the property. Property owner/manager pays the utility bill, and has no knowledge of individual tenants' usage.	CPUC no longer allows <b>new</b> master meter meter arrangements in most residential situations.	Mobile home parks are billed by utilities for all the usage at the park, by means of a Master Meter.
Master Meter/Sub-Metered (Configuration Two)	Type of utility meter which is used to measure all electricity to the property, coupled with submeters (owned by property owner, not utility) on individual tenants' units. Property owner/manager pays the utility bill, but submeters track individual tenants' usage, and property owner/manager usually charges tenants for their usage.	CPUC no longer allows <b>new</b> master meter/sub meter arrangements in most residential situations, but encourages sub-metering of existing property that has master meter only.	Mobile home parks are billed by utilities for all the usage at the park, by means of a Master Meter.
Master Meter (Configuration Three)	A Master Meter is used for tracking the <b>net</b> energy supplied by a utility to a property, net of the site solar generation. It would not be used by the utility for directly billing a property owner or manager. Instead, it would be used in conjunction with tenants' individual meters to determine tenants' purchased energy net of the site generation.	* Proposed new configuration. It may need to be called something else in order to avoid confusion with current usage of "Master Meter."	Pro-rating proposal would use a Property Meter to determine what portion of the tenants' total load was supplied by the utility.
Sub Meter (noun)	A <b>non</b> -utility meter used to determine a specific tenant's electricity usage for purposes of determining that tenant's share of the electricity used at the property.	Requires both CPUC and Department of Weights and Measures approval. New installations at currently master metered properties without sub-metering is encouraged.	Mobile home park owners bill tenants based on usage logged via Sub Meters at each space.
Sub Meter (verb)	Disaggregation of an aggregated load by a master metered customer; determining individual tenants' energy usage. Usually implies related billing activity by the party on the master meter.	Often carried out by a third party for a fee. Total of all submeter charges are required by law to be at or below what the utility's direct charges to the same set of customers would be	1960s vintage apartments, mobile home parks.
Individual Meter	Utility meter used to determine one tenant's electric usage. May or may not be a net meter, but is distinct from a sub meter because it is the basis of a <b>utility</b> bill.		Any tenant who pays his/her own utility bill directly to the utility is on an individual meter. Community Housing Works' tenant dwellings also have individual, utility meters (per the current CPUC rules), but the developer pays all of the electricity bills.

### ***Existing Metering Options for PV Installations in Multifamily Affordable Housing***

To date, metering options have been limited for PV in multifamily affordable housing. There are currently two main options: Individual Net Energy Metering for each unit or Common Load Net Energy Metering, both of which are outlined in the following table:

***Table 2.***

<b>Metering Options for Solar on Multifamily Affordable Housing</b>					
<b>Metering Options</b>	<b>Description</b>	<b>Relative Cost to Install System</b>	<b>Benefits Flow To</b>	<b>Regulatory Approval Required?</b>	<b>Other Considerations</b>
<b>Individual NEM</b>	Individual solar systems for each living unit. Interconnection through individual unit meters. Net energy metering (NEM) for each unit.	\$\$\$ Separate panels, inverters, wiring, etc.	Tenant	<b>No</b>	Consistent with current regulation Direct tenant benefit Not practical for retrofits
<b>Common-Load NEM</b>	One solar system sized to common area load only. NEM for common area meter only. Owner responsible for common area load NEM bill.	\$ Only one system installed on a single meter	Building Owner	<b>No</b>	Consistent with current regulation Simplest to implement No direct benefit to tenants

The problem with the status quo is that neither option allows for a simultaneous combination of cost effectiveness for the owner, optimal use of roof space, and direct benefit to the tenant. Bearing these barriers in mind, the Subcommittee attempted to explore and analyze alternative options.

### ***Potential Metering Options for PV Installations in Multifamily Affordable Housing***

#### ***Option 1 – Individual Tenant Systems***

The first apartment complex in California that was designed to have its electricity fully powered by PV is SOLARA. Located in the territory of investor-owned-utility, San Diego Gas & Electric (SDG&E), SOLARA is subject to CPUC-established rules and tariffs. Current requirements of such are that each apartment unit must be separately metered for electricity. In order to obtain the full benefit of net metering, Community HousingWorks (Developer/Owner of SOLARA) thus had to design separate PV arrays (with related inverters) for each unit, and for the house meters – which resulted in the 56 unit development having 63 electric meters/PV arrays/inverters.



Community HousingWorks (CHW) decided to pay all the utilities of SOLARA, but to provide an incentive program to positively reward conservation of residents. To implement it, they designed a solar monitoring system. They also developed and implemented a Green Curriculum for resident services to provide education, in order to ensure that residents would be responsible users of electrical power. With the current flat area-wide utility allowances, the choices available to CHW were either to have a Zero Utility Allowance (i.e., no deductions from maximum rents for utilities, including electric) or to reduce rents by the Utility Allowance (UA). The allowance would have exceeded anticipated electric bills. The latter was not financially viable, so CHW chose to pay all utilities and use the increment of rent that exceeded the UA-estimated electric bills for capital investment in the PV. It was used to cover the portion of PV capital costs that were not covered by other rebates or tax credits.

The design and billing arrangement that CHW was limited to under current CPUC rules was not optimum. Accordingly, CHW met with SDGE staff in October 2005 regarding potential alternatives that would allow it to either: 1) load all the PV on to 1-2 meters/inverters but spread the PV offsets of the Interconnection Agreements to each of the electric meters through billing allocation; or 2) pool the billing of the complex so that all electric usage of the 63 meters was offset by all PV generation fed to the grid from all of the 63 meters – so CHW would not be artificially penalized if some residents conserved more than predicted and others were not able to conserve as much. SDG&E studied the issue for some months and responded that to provide either arrangement would require a CPUC rule/tariff change<sup>4</sup>. By then, SOLARA was in construction and physical changes to the PV connections were not possible.

Either of the two suggestions CHW made to SDG&E would have provided an economically viable solution for SOLARA. Either would also have been beneficial to similar projects developed in IOU territories, without requiring a major overhaul of tariffs relating to Net Metering. However, neither suggestion is the optimal solution. Both would not solve the costly issue of sizing arrays by apartment unit nor the increased costs associated with so many inverters. Additionally, they ignore the potential benefits of pooling a complex's uses.

CHW currently serves on the Subcommittee on Metering and has been extremely helpful in sharing its lessons-learned. The Subcommittee recommends that existing PV installations in multifamily affordable housing projects (like SOLARA) be grandfathered into any future CPUC tariffs and Net Metering modifications so that pioneering projects receive the benefit of “pooled billing” – i.e., allocating the Net Metering (e.g. over the entire 63 units in SOLARA's case).

NOTE: One additional way of designing individual tenant systems is the model utilized by Danco Communities in Courtyards II – a property that opened on July 1, 2007. This

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<sup>4</sup> On May 7, 2007, SDG&E submitted Advice Letter 1895-E to the CPUC, to establish a Photovoltaic Purchase and Credit and permit owners of Affordable Housing Multifamily Accommodations the option to provide their tenants with benefits equivalent to those derived from Net Metering, while avoiding the substantial cost of installing individual photovoltaic inverters to serve each tenant.

property has individual systems, as well as individual meters and individual tenant bills. Contrary to SOLARA's model, the owner of Courtyards II is not receiving or paying the bills. This is currently allowed, but it required that the utility allowance for Courtyards II be changed in order for the owner to recoup the capital expense of the PV installation. While changing the utility allowance can be an extra hurdle, it does provide the benefit of tenants paying their own bills and having an incentive to conserve electricity.

### ***Option 2 – Master Metering***

With this option, there are two relevant types of master metering scenarios (see Table 1):

- **Master Meter Configuration One:** The Master Meter is a utility meter which is used to measure all electricity to the property. In this case, the property owner/manager pays the utility bill, and has no knowledge of individual tenants' usage. Utility costs are passed on as are all other “maintenance” costs in the tenants' rent.
- **Master Meter Configuration Two:** The Master Meter is used to measure all electricity to the property, and in this case, is coupled with sub-meters (owned by property owner, not utility) on individual tenants' units. Property owner/manager pays the utility bill, but sub-meters allow them to track individual tenants' usage. Property owner/manager usually charges tenants for their usage.

Both scenarios are potential models for incorporating PV into a property. However, since 1982, the CPUC has prevented new multifamily buildings from utilizing master metering. This change in the regulations was due to instances of abuse – such as landlords profiting from reselling the power to tenants in master metered buildings at a higher cost than they paid. Currently, only certain commercial buildings, trailer parks, single room occupancy buildings, and retirement facilities are exempt from the moratorium on master metered buildings.

If master metering was allowed, there would presumably be three ways in which using PV would be feasible:

1. Use one PV meter and the owner pays for the bills;
2. Use one PV meter and the building has third party utility meters;
3. Use one PV meter and install sub-utility meters.

Although this model could be effective, its challenges include: increased operational costs for utilities, and difficulties in petitioning the CPUC to change its current regulations to allow master metering in new construction.

Perhaps the biggest hurdle with this option is convincing the CPUC to change the regulations. Accomplishing this would require a compelling strategy of how to prevent future billing abuses. Preventing abuse might be streamlined if the utility or regulated

third party billing company managed the oversight. And technological advances – such as the advent of smart meters – might also make abuse prevention more practical.

The Subcommittee recognizes that this option might be feasible for certain properties – such as cooperative affordable housing (which are always on one meter). However, due to the regulatory challenges, it does not consider this a viable option for the majority of affordable housing properties.

### ***Option 3 – The SMUD Model***

One potentially useful model of metering PV on multifamily affordable housing is the one currently practiced by the Sacramento Municipal Utility District (SMUD). This model uses a PV system that is tied into a common area load meter. The entire system is eligible for residential solar rebates. The tariff is set at the Time of Use (TOU) residential rate, and all residences in the complex use the same TOU tariff that is also applied to the PV system. A Power Purchase Agreement (PPA) exists for the energy in excess of the common area load. The utility purchases excess electricity at the same retail residential tariff as the non-excess energy.

The advantages of this model include:

- Simplified hardware: One PV array, one inverter;
- Simplified billing: The utility tracks one net metered account per facility instead of dozens or hundreds;
- Simplified financing: Rather than asking the developer to recoup the investments through a project specific utility allowance and increased rents, the money goes directly to the developer to recoup expenses;
- Proven track record: The model is already being implemented at SMUD and has proven successful.

The potential disadvantage to this model is that it requires a change to the rebate law in order to allow rebates to be given to a system that produces in excess of demand. Being a municipal utility, SMUD is not subject to this regulation, but as investor owned utilities (IOUs) PG&E, SCE, and SDG&E are. There may also be difficulties with utilities that have tiered rate structures. The single meter baseline would somehow have to correspond to the total of the individual meters baselines.

Despite these challenges, this model is a streamlined and efficient way of metering PV in a multifamily affordable housing facility. The Subcommittee thus recommends this model as a viable option.

### ***Option 4 – Pro-rating of Master Meter Energy Use***

The Pro-Rating Metering and Billing option provides some of the benefits of the PV system directly to the tenants of multifamily buildings through reducing their energy bills by a prorated share of the site solar energy. All tenant meters and the common area

meter(s) will record actual energy use. Because a PV system on the property will be supplying some electrical energy, the sum of energy **use** from all the individual meters on the property will be greater than the power purchased from the utility. The difference is the PV energy produced, and the ratio of energy purchased divided by energy used will be used to adjust each tenant's monthly kWh usage. In other words, that ratio will be used to allocate shares of the total (net) energy supplied by the utility.

Tenants' meters will be utility meters (not sub-meters). The power coming into the property from the utility will be measured by a utility master meter. The subcommittee recommends that the master meter be a net meter so that when less energy is being used on the property than is being produced, that it can be fed back into the grid to the economic benefit of the tenants. The following discussion is based on that assumption.

The basis of this metering and billing scenario is that the utility will directly bill each tenant but the electricity (kWh) for which a tenant is billed is not the full amount shown on the tenant's meter. The energy use is pro-rated by the ratio of net energy used at the property (net energy on the master meter), divided by the total energy used by all tenants. (See the equation below.) The net energy usage is measured and recorded by use of a net master meter at the utility connection to the property. Before the applicable rate (¢/kWh) is applied to a tenant's energy usage, the account's recorded kWh will be pro-rated (multiplied by the ratio of the amount on the master (property net) meter, divided by the total of all the individual meters). The equation looks like this:

Net (billed) kWh for specific tenant = [kWh from master (net) meter / Sum of kWh from all individual utility meters] x kWh from specific tenant's individual meter

Since some tenants will likely be on CARE rates and others not, the kWh for billing purposes will be multiplied by each tenant's applicable rate. The value that is pro-rated is the energy (kWh) used, not the energy cost.

This Metering/Billing option will require filing of an advice letter by each electricity utility intending to employ it. As aforementioned, SDG&E has filed an Advice Letter to the CPUC to implement something similar to this system. The Subcommittee members have not yet had a chance to analyze the filing to see how closely it meets the intent of the pro-rating system the committee is proposing, but since it applies one rate (tariff) across all tenants, it does differ somewhat from this proposal.

Use of a pro-rating metering/billing system will also require changes to each utility's billing system. There are a few issues that need to be addressed to make this metering/billing option work for all parties – utilities, tenants, and property owners. Most of the issues are related to the complexities that will have to be introduced into the utility billing systems.

1. True-Up Issues: The current (single family) net metering scenario requires an annual true-up so that if a property generates more than it uses some months, the credit can be applied across other months when it uses more than it generates. It

is unlikely that there will be a workable way to accomplish the same thing with multi-tenant property that has only one PV system with one inverter. Primarily this is because tenants move in and move out on different schedules, and the administrative costs of trying to credit a departed tenant will likely exceed the value of the credit. Likewise, there are equity issues with giving a tenant who used a significant amount of air conditioning in the summer, credit created by a previous (winter/spring) tenant of the same unit, who was very conservative (e.g., during spring). Therefore, the Subcommittee suggests that net energy credits be allowed to expire (a) on a monthly (instead of annual) basis, or (b) upon a tenant's moving out<sup>5</sup>.

2. Utility Billing Software Issues: Significant modifications may be necessary to utility billing system software. The degree and difficulty of making the changes will certainly vary from one utility to the next. Nor can all questions that could be raised by implementation of a pro-rating metering/billing system be anticipated ahead of time. Therefore, the subcommittee suggests that utilities be allowed to try out pro-rating metering/billing systems on a pilot basis, and make the major modifications to their systems only after they have sufficient experience and data.
3. Tenant Rate Issues: Again because of billing complexities, it would be tempting to require that all tenants in the subject buildings be on the same rate. That would require either that all tenants have CARE rates, or that none do. That requirement would eliminate virtually all potential participant projects since only a very small percentage of affordable housing has all CARE-rate tenants or no CARE-rate tenants. Even if a project has all income-qualified tenants, there are still generally some who are not on CARE rates. Further, a significant percentage of affordable housing projects include some market rate tenants.

Similarly, it would be tempting to credit back all the net energy at one rate, regardless of differences between the rates at which tenants pay for energy they purchase from the utility. For example, it would be easier for the utility if all the “net” energy were credited at CARE rates. However, this requirement would be completely at odds with the intent of net metering and would be unfair to some of the tenants. In exchange for a guarantee that the utility will never have to buy power from residential property owners in excess of those owners’ usage, net metering requires the utility to purchase the PV energy at the same rate that the residents purchase power from them (retail rates).<sup>6</sup> In the pro-rating case that the subcommittee is recommending, the utilities would have the added economic benefit of not having a carry-over of net energy from one month to the next (or one occupant to the next). Consequently, the only fair rate at which to value the

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<sup>5</sup> There was some disagreement within the Subcommittee as to whether or not this would be financially feasible, particularly if tenants are required to subscribe to TOU rates. In such cases it might be more beneficial to not allow the credits to expire.

<sup>6</sup> The Subcommittee notes that “net metering” was designed for single family residences, and the rules surrounding it were not deliberated in the context of the current proposal. Nonetheless, residential net metering is based on certain principles that still make sense for multifamily residences. The rules that flow from those principles should be consistent unless compelling, overriding concerns dictate otherwise.

net energy allocated to each tenant is the retail rate at which THAT tenant is buying energy from the utility. The simple way to accomplish this is to use the master meter and individual meters to net the energy (kWh) for each tenant, and THEN apply that tenant's electricity rate (including whether they are on CARE rates or not).

4. **Transformer Capacity Issues:** The capacity of transformers needed to connect a net metered PV system sized to cover a property's total peak load could be problematic. Early discussions with utility staff uncovered a transformer size constraint that might be smaller than the potential generation net output (to the grid) from systems sized to meet a multifamily building load. This issue was not resolved within the Subcommittee. It could be that transformer size limitations will require developers to have several inverters associated with groupings of tenant spaces. If this is the case, it is not evident that it would add any complexity to a pro-rated metering/billing system.

Despite the complexities, the Subcommittee recommends this model as a viable option for implementing PV in multifamily affordable housing properties.

#### ***Option 5 – Power Purchase Agreement with Market Reference Price***

The Market Reference Price (MRP) is the mechanism by which utilities pay a fair market price for purchasing renewable power. If a power producer requires more than the MRP, it needs to petition the CEC and CPUC. Applying this in the multifamily affordable housing context is a way of enabling the property to be paid for excess PV generation.

This option is similar to Option 3, except that the Power Purchase Agreement (PPA) would be based on the Market Reference Price (MRP) instead of the residential Time of Use tariff.

The advantage to this option is that it is already legal – thus, excess PV generation could be immediately sold. However, if the existing MRP is not high enough, the property owner would need to petition the CEC and CPUC for supplemental funding. This could delay the project planning process and ultimately cause the financing to fall flat.

Therefore, because of the uncertainty of the MRP, the Subcommittee does not recommend this option as a viable model for most multifamily affordable housing properties.

#### ***Option 6 – The Third Party Ownership Model***

The previous five options focused on models in which the owner of a multifamily affordable housing property would own the PV system installed on the property. However, there is another potential ownership structure: The Third Party Ownership Model (TPO).

With TPO, the property owner would provide the rooftop space and allow an independent entity to install, maintain, and coordinate production payment with the utility. This relationship could be handled via a lease or some other formal agreement/contract between the TPO and the property owner.

One example of TPO is what Brobeck Solar Energy (BSE) – currently a member of the Subcommittee – has recently developed.

BSE created a proprietary approach, called The Brobeck Solar Energy Debit Card (EDC), in which BSE contracts with the developer to lease its rooftop for installation of a PV system with one meter. BSE arranges, at its own cost, for each PV system to be installed (using licensed contractors, warranted and insured as required under the California Solar Initiative). BSE owns, operates and maintains each PV system and arranges a PPA with the utility to purchase all electricity generated from the systems at a negotiated rate – designed to provide appropriate incentives to maximize both generation and the benefits under the EDC. Each developer receives the EDC; alternately, the developer may elect to have EDC issued to its tenants. BSE credits the EDC for each kilowatt-hour of electricity generated by the PV system at the developer's location. Where multiple EDC recipients receive energy credits from a single PV system, allocation of energy credits are divided in a manner mutually agreed upon by the building owner, BSE and regulators.

Recipients of the energy credits use them to purchase energy efficient appliances or other goods and/or services (such as public transit passes) that further California's energy policies. Finally, BSE arranges, at its expense, to implement a verification process to ensure the EDC and energy credits are used only for permitted purchases.

The advantages of TPO, and BSE's model in particular, include: maximization of roof space for PV systems, decreased maintenance burden for the property owner, diminished complexity of net metering and multiple inverters, affordability for the property owner, avoidance of TOU metering impacting existing rates, and creation of energy efficiency benefits for the property owner and tenants (which is one of the key objectives of SB 1).

However, there are also disadvantages to this approach, such as: minor benefits to the property if the PPA purchase price is low, and risk of less beneficial contract terms if the original PPA was less than 15 – 20 years.

Despite these disadvantages, the Subcommittee considers this model to be viable for some types of projects, and therefore recommends it as one of top three the options.

### ***Conclusion***

The nature of the multifamily affordable housing market requires that opportunities be maximized due to constrained resources. Because of this, it is important for a variety of PV metering scenarios to be available so that affordable housing developers can tailor a solution to the specific needs of their projects. However, for reasons already discussed, the Subcommittee finds the most viable models presented in this analysis to be The

SMUD Model (Option 3), the Pro-rating of Master Meter Energy Use (Option 4), and the Third Party Ownership Model (Option 6). We therefore recommend that the AHAC encourage the CEC to promote these three metering models with the New Solar Homes Partnership.